Charter Boat Harvest and Effort from the Michigan Waters of the Great Lakes, April through October 2003

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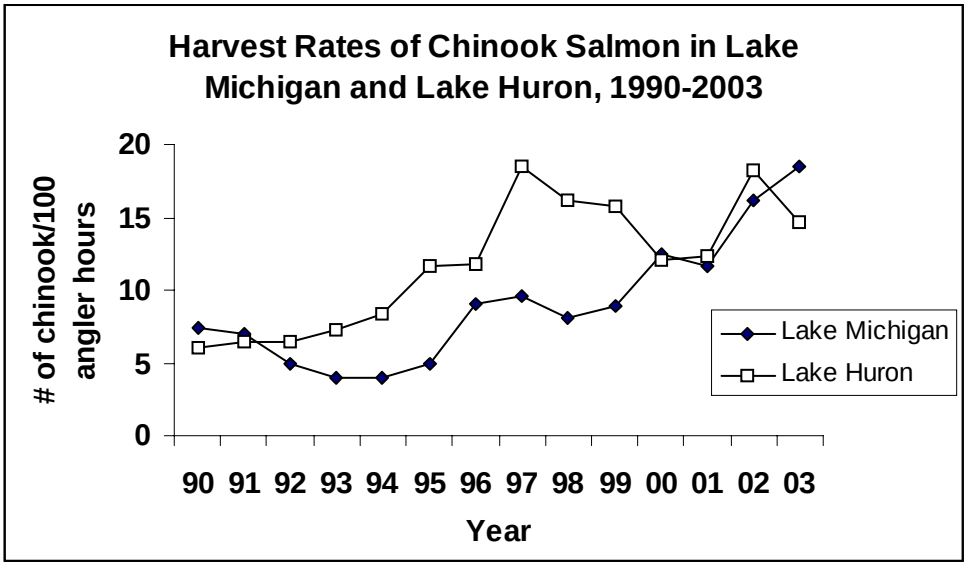

Michigan Department of Natural Resources
Fisheries Division
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Introduction

Michigan's charter boat industry increased from 250 operations in 1979 to nearly 900 in 1989. Since the late 1980s, the number of charter boats used for sport fishing excursions on Michigan's Great Lakes waters has declined to approximately 550. The charter fishing industry provides Michigan with significant economic benefits. For example, 239,000 clients spent an estimated $21 million in addition to charter fees in 1985, and the total statewide investment by charter boat firms in the same year was estimated to exceed $30 million.

Reporting of sport catch and effort by the charter fishing industry is required under Public Act 451 (Part 445) of 1994. Similar legislation was first enacted during 1989 (Act 22, Public Acts of 1989) and was supported by the Michigan Charter Boat Association (MCBA) and the Michigan Department of Natural Resources (MDNR). Among other provisions, the law includes stringent penalties for charter fishing operators who are delinquent by more than 60 days with their catch reports. Furthermore, the law states that charter operators keep an up-to-date daily log of their fishing activity and harvest onboard their vessel at all times.

The objective of the catch reporting system is to obtain a continuous annual record of (1) charter fishing effort and (2) number, type, and location of fish harvested by charter anglers. These data assist MDNR's Great Lakes fishery management efforts because they are used to track changes in fishing harvest and harvest rates over time. These changes in harvest help MDNR evaluate the status of fish stocks. They also provide a measure of the health and welfare of the charter industry.

Methods

In 1989, a committee of two members each from MDNR and MCBA developed The Michigan Charter Boat Daily Catch Report form. This form is mailed to all known charter operators in the spring of every year. Great Lakes grid maps (used to identify fishing location) are included with this mailing. Charter operators are identified from a list of operators who had submitted catch reports the previous year. MDNR's Law Enforcement Division helps identify any new operators each year by providing the names of individuals who applied for and/or received new Sport Trolling Licenses.

Charter operators are required by law to complete the form each time they fish. The form is to be mailed to the Charlevoix Fisheries Research Station by the tenth of each month following the month of fishing. At the top of every form, charter operators must list his/her charter boat identification number and the lake that was fished. If a charter operator owns more than one boat, or fishes in multiple Great Lakes, he/she must fill out a form for each boat and each lake. For a given boat and lake, data from every excursion must be recorded, regardless of fishing success. Each excursion must include: date, port of origin, grid where a majority of the fishing occurred on that excursion, hours fished (dock to dock), number of resident and nonresident anglers, harvest (number) of major species, and number of sea lamprey seen attached to chinook salmon and/or lake trout. Space is provided at the bottom of the form for comments and observations.

Charlevoix Fisheries Research Station personnel keep records of forms as they are received and enter the data into a database. The data are summarized to describe port-specific and lake-wide trends in the effort and harvest of major sport-fish. Incomplete forms are returned to the charter operator with a letter explaining why the report was returned and a request that a correction be made.

The majority of charters operate during April through October. Each month, June through October, MDNR issues postcard notices to charter operators who do not file a catch report from the previous month. Two notices are sent each month, the first after an operator is delinquent for 10 days and the second after 30 days. Operators who do not file reports for two or more months during the period May through September are sent letters via certified mail. These letters inform the operator that he or she is

receiving the final request to submit their reports. If the recipient does not respond in writing within 10 days of receipt of this notice, his or her name may be submitted to MDNR's Law Enforcement Division recommending non-issuance of an inspection certificate for the following season.

Charter data are used to summarize three types of fishing effort: angler hours, angler trips, and charter excursions. Angler hours are the total number of hours in an excursion, dock to dock. An angler trip is one completed fishing outing by one individual. A charter excursion is one completed boat trip. For example, if a charter operator took four anglers fishing for six hours, total fishing effort is 24 angler hours, 4 angler trips, and one charter excursion.

Charter data are also used to summarize the harvest and harvest rate of those sport-fish listed on the form. Harvest is the number of fish. Harvest rate is the number of fish harvested in a given amount of time (e.g. number/hour).

Charter operators also record the number of sea lamprey observed on lake trout and chinook salmon. These data are collected by request of the U.S. Fish and Wildlife Service's (USFWS) Sea Lamprey Control Station in Marquette, Michigan, where they are used as an index of sea lamprey abundance.

Results

Compliance

During the 2003 fishing season, an average of 62% of all charter boat operators complied with the law by submitting their catch reports on time, while 78% submitted reports within 30 days of the due date. Monthly rate of compliance in 2003 was slightly greater than in 2002. By January, 2004, 98% of all charter operators had complied with the law.

Fishing effort

From April through October, 2003, charter anglers participated in 17,531 charter excursions on the Michigan waters of Lakes Michigan, Huron, Erie, Superior, and the St. Clair system, including major tributaries (Tables 1 through 5). These excursions consisted of 75,103 angler trips and 442,451 angler hours. The St. Clair system includes Lake St. Clair, the St. Clair River and the Detroit River.

The “overall” change in charter effort (i.e., across all Great Lakes) from 2002 to 2003 did not change appreciably. Relative to 2002, the total number of charter excursions in 2003 increased by +1%, the total number of trips decreased by less than 1%, and the total angler hours decreased by 1%, none of which are significant. It is important to recognize that these overall changes are most influenced by what occurs on Lake Michigan because most of the charter effort in the Great Lakes occurs on Lake Michigan (69% this year); therefore, “overall” changes may not be reflective of what occurs on an individual lake. There were 12,094 charter excursions on the Michigan waters of Lake Michigan, April through October 2003. This is only 170 (+1.5%) more than the number of excursions in 2002 (11,924). If one were to distribute this change across the large number of operators on Lake Michigan the change appears even less significant. In contrast, there were 466 excursions on the Michigan waters of the St. Clair system in 2003. In 2002, there were 246 excursions (Note: This number is different from the number that appeared in the 2002 Charter Report. An error was found and has been corrected.) This means that almost twice as many excursions occurred on the St. Clair System in 2003 (89% increase from the previous year). If one distributes this change across a much smaller number of operators in the St. Clair System, one may see that this change has a much greater significance for the charter operators in this system.

On the other lakes, Lake Huron had 3.6% less excursions, Lake Erie had 9% less excursions, and Lake Superior had 17% more excursions. Only Lake Superior and the St. Clair system show noticeable changes in effort. The number of excursions over the last 14 years has varied over time on all Great Lakes (Table 6). Further discussion of changes in effort over time on individual lakes will be presented in upcoming annual reports.

In 2003, 27% of all charter anglers were non-residents of Michigan. This figure has

remained quite stable over the last few years. Non-residents usually frequent Lake Michigan; however, Lake Superior charter operators continue to host the greatest ratio of nonresident to resident anglers (43%; Table 4).

Harvest

Charter operators reported a total of 214,571 fish harvested from the Michigan waters of the Great Lakes and its major tributaries, April through October of 2003 (Tables 1 through 5). Most of these fish were harvested from Lake Michigan (49%), followed by Lake Erie (31%), and Lake Huron (11%). The most numerous species in the total harvest was chinook salmon (65,715), followed by yellow perch (50,148) and walleye (44,666). Numbers of fish, by lake, are informative; however, there are other ways to compare the harvest across lakes that may provide additional insight. For example, if one considers harvest numbers relative to water surface area, Lake Erie charter operators likely harvest the most fish (In 2003, 65,112 yellow perch and walleye were harvested from this area alone). If pounds of fish are compared, rather than numbers, a different relationship may occur. These alternative methods of comparing harvest will be explored in upcoming annual reports.

Historically, the most abundant species in the harvest has been yellow perch; however, between 2002 and 2003, the number of chinook increased and the number of yellow perch decreased; thus making chinook the most abundant species in the harvest. Relative to 2002, 2003 chinook harvest numbers increased by 6%, yellow perch numbers decreased by 24%, and walleye harvest numbers increased by 11%.

The total number of other species in the 2003 harvest was: 25,146 lake trout (12% more than last year), 10,903 coho salmon (37% less than 2002), 10,126 rainbow trout (13% less than 2002), and 1,588 brown trout (38% less than 2002). The "other" species category accounted for the remainder of the harvest; however, the species composition of this category is not fully known because MDNR does not require it to be identified. Charter operators who wish to identify this category can do so in the "Comments" section on the Charter Catch Form.

The St. Clair system boasts the highest number of "other" species in the charter harvest. Many of the species in the St. Clair system are not listed individually on the charter form (e.g. smallmouth bass); therefore, they are listed in the "other" category. The St. Clair system also supports a popular "catch and release" fishery for species such as muskellunge. Currently, charter operators are not required to report any of the species categorized as "other", nor are they required to report released fish. These types of fisheries may be of substantial interest in the future to warrant their inclusion on charter catch forms in the future, at least for this area.

The overall numbers of salmonines (chinook salmon, coho salmon, lake trout, rainbow trout, and brown trout) harvested from Michigan's Great Lakes waters decreased by 2,336 fish (-2%) from 2002 to 2003. This is an insignificant decrease, particularly when it is compared to the increase of 18% that occurred between 2001 and 2002.

Harvest rates

In 2003, charter anglers harvested 0.485 fish (all species from all lakes combined) per hour. In words more applicable to the charter industry, if an angler took a 5 hour charter trip on the Great Lakes, he/she was able to harvest an average of 2.42 fish.

On Lake Michigan, charter anglers harvested 0.341 fish (all species combined) every hour. In words more applicable to the charter industry, if an angler took a 5 hour charter trip on Lake Michigan, he/she was able to harvest an average of 1.70 fish. This is only slightly higher than 2002, when the harvest rate of all species combined in Lake Michigan was 1.63 every 5 hours.

By species, the average Lake Michigan charter angler caught 0.92 chinook salmon every 5 hours (12% more than 2002); 0.17 coho salmon every 5 hours (32% less than 2002), 0.16 rainbow trout every 5 hours (6% less than last year), 0.13 lake trout every 5 hours (24% less than last year); and 0.02 brown trout every 5 hours (71% less than 2002). Catch rates

decreased between 2002 and 2003 for all salmonines except chinook salmon; however, since so many more chinook salmon were harvested in 2003 relative to 2002 (6,531 more), the overall species catch rate did not decrease. In fact, the catch rate of chinook salmon on Lake Michigan in 2003 was the largest ever in the 14 years that charter data have been reported.

Yellow perch and walleye (percid) harvest rates in Lake Michigan are reported on Table 1; however, harvest rates have always been based on the total charter fishing effort that occurs on Lake Michigan. In this Great Lake, a majority of the effort is targeted at salmonines, not percids. If total effort is used to calculate the harvest rate of percids, the rates will likely be greatly underestimated. We will attempt to correct this underestimation in future reports by providing catch rates that are adjusted to reflect effort targeted at yellow perch and walleye. We can, however, still make comparisons "over time" if one assumes the effort targeted at these species has been stable over time. If so, yellow perch catch rates were 61% higher and walleye catch rates 20% higher in 2003 compared to 2002.

On Lake Huron, charter anglers harvested 0.417 fish (all species combined) every hour. If an angler participated in a 5 hour charter excursion, he/she was able to harvest an average of 2.08 fish. This is slightly higher than 2002, when the harvest rate of all species combined was 1.96 every 5 hours.

By species, the average Lake Huron charter angler caught 1.03 lake trout every 5 hours (62% more than last year), 0.73 chinook salmon every 5 hours (20% less than 2002), 0.04 rainbow trout every 5 hours (56% less than last year), 0.04 brown trout every 5 hours (75% higher than 2002), and 0.02 coho salmon every 5 hours (76% less than 2002). Catch rates increased for lake trout and brown trout, but decreased for all other salmonines. Interestingly, the 2002 catch rate of coho salmon on Lake Huron (0.10 fish per 5 angler hours; Table 7) was the greatest recorded in the 1990-2002 data series. In 2003, it decreased significantly. For many of the lakes, the catch rates of coho, rainbow, and brown trout have shown substantial variation over time.

Compared to Lake Michigan, 2003 harvest in Lake Huron was dominated by lake trout rather than chinook salmon. Harvest rates of rainbow trout and coho salmon were much lower in Lake Huron than they were in Lake Michigan, which has been a consistent pattern over the last 14 years (Table 7). Lake trout and chinook harvest rates tend to be more comparable between these two lakes.

Similar to Lake Michigan, Lake Huron percid catch rates should not be compared to salmonine catch rates until the targeted effort for these two groups can be separated. Relative changes "over time", however, suggest 2003 yellow perch catch rate has dropped by 11% (0.04 every 5 hours) and walleye catch rate has increased by 48% (0.16 every 5 hours) since 2002. A more accurate measure of these rates will be presented in upcoming annual reports.

In Lake Superior, lake trout are the most important salmonine in the charter harvest (Table 4). Compared to 2002, 2003 harvest rates of lake trout on Lake Superior declined slightly (-1%). In 2003, an average charter angler harvested 1.36 lake trout every 5 hours. This is the highest lake trout harvest rate in all of the Great Lakes, even though the total numbers of lake trout are much lower than they are in Lake Huron and Lake Michigan. However, Lake Superior fishing effort is primarily targeted at lake trout, while effort in Lake Michigan is often targeted at a mixed bag of salmonines. In both cases, total effort is used to calculate harvest rates because targeted effort, by species, can be calculated. It is often possible to separate fishing effort between "groups" of fish, such as percids (yellow perch and walleye) and salmonines (i.e. fishing trips usually target one or the other); however, it is usually not possible to separate fishing effort between species within these groups (i.e. fishing trips usually target more than one species within a group). Consequently, lake trout harvest rates in Lake Superior appear to be higher, but these same rates are possible on Lake Michigan and Lake Huron.

Many charter captains in Lake Superior, Huron, and Michigan consider the "mixed bag" (chinook, coho, lake trout, rainbow and brown trout) a measure of a successful charter excursion. In 2003, the total mixed bag harvest per charter excursion increased at Grand Haven and Ludington, although the change at Ludington was minor (1%) (Table 9). Mixed bag catch rate increased at four of the five selected Lake Huron ports in 2003, with the largest increase occurring at Rogers City (+51%) (Table 9). On Lake Superior, the mixed bag catch rate increased slightly at Ontonagon (+3%), but declined at Black River Harbor (-14%) and Marquette (-12%) (Table 9).

Walleye and yellow perch are the dominant species in the charter harvest on Lake Erie and the St. Clair system. Most of the effort in Lake Erie is targeted at yellow perch and walleye; therefore, their harvest rates are much more accurate than the harvest rates on other lakes. In 2003, harvest rates of walleye were 4.22 every 5 hour, and harvest rates of yellow perch were 3.05 every 5 hours. Compared to 2002, walleye harvest rates increased by 14%, and yellow perch harvest rates decreased by 37%.

Yellow perch and walleye harvest rates on the St. Clair system are less accurate because the effort used to calculate these rates is targeted at "other" species, too. In 2003, Yellow perch harvest rates on the St. Clair system were 2.33 every 5 hours, and walleye harvest rates were 1.18 every 5 hours. Compared with 2002, yellow perch harvest rate decreased by 57% and walleye harvest rate increased by 78%, although the accuracy of these changes is questionable since fishing effort targeted at percids cannot be separated from fishing effort targeted at "other" species.

In 2003, sea lamprey occurrence on *chinook salmon* increased in both Lake Michigan and Lake Huron compared to previous years (Table 10). This occurrence was at its highest level in Lake Michigan since data were first collected in 1990. Occurrence in Lake Huron also increased, but remained well below historical rates.

In 2003, sea lamprey occurrence on *lake trout* increased in Lake Michigan. This occurrence was at its highest level in Lake Michigan since data were first collected in 1990. In contrast, sea lamprey occurrence on lake trout in Lake Superior was slightly lower than 2002.

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Table 1.—Total harvest per hour, harvest per excursion, number harvested, and fishing effort (angler hours, trips, and charter excursions) from charter boats on the Michigan waters of Lake Michigan (and its tributaries), April through October 2003.

			Month							
Species	Total catch per hour	Total catch per excursion	Apr	May	Jun	Jul	Aug	Sep	Oct	Season
Coho salmon	0.034	0.870	499	1,780	1,669	727	4,012	1,786	52	10,525
Chinook salmon	0.185	4.724	76	6,065	4,788	7,790	30,072	7,940	405	57,136
Rainbow trout	0.031	0.794	175	2,057	1,740	1,866	2,437	538	785	9,598
Brown trout	0.004	0.098	230	434	107	149	214	51	5	1,190
Lake trout	0.026	0.671	4	1,260	1,689	2,603	2,372	190	2	8,120
Yellow perch	0.053	1.345	0	2,152	2,101	4,115	6,479	1,420	4	16,271
Walleye	0.006	0.159	0	163	485	325	558	181	207	1,919
Other	0.001	0.026	8	4	146	74	30	35	12	309
Lamprey on:										
Chinook salmon			2	12	18	119	430	104	2	687
Lake trout			0	16	35	59	82	3	0	195
Angler hours			4,482	31,472	41,446	62,623	125,587	35,549	6,913	308,072
Angler trips			679	5,246	6,673	10,680	21,296	6,332	991	51,897
Anglers										
Resident			385	3,171	4,277	7,276	15,225	4,663	489	35,486
Nonresident			301	2,075	2,415	3,412	6,081	1,669	505	16,458
Charter excursions			171	1,126	1,517	2,495	4,905	1,557	323	12,094

Table 2.—Total harvest per hour, harvest per excursion, number harvested, and fishing effort (angler hours, trips, and charter excursions) from charter boats on the Michigan waters of Lake Huron (and its tributaries), April through October 2003.

Species	Total catch per hour	Total catch per excursion	Month							
			Apr	May	Jun	Jul	Aug	Sep	Oct	Season
Coho salmon	0.005	0.100	4	35	35	88	54	50	10	276
Chinook salmon	0.146	3.080	56	1,019	1,305	1,584	3,451	1,065	56	8,536
Rainbow trout	0.007	0.155	2	48	103	144	114	17	2	430
Brown trout	0.007	0.141	1	23	46	147	143	32	0	392
Lake trout	0.206	4.345	2	1,055	2,911	3,306	3,848	898	21	12,041
Yellow perch	0.008	0.179	0	0	11	48	129	307	0	495
Walleye	0.033	0.686	3	27	412	1,007	423	27	1	1,900
Other	0.004	0.089	0	3	54	140	40	10	0	247
Lamprey on:										
Chinook salmon			0	63	58	147	196	48	2	514
Lake trout			0	20	31	33	51	18	0	153
Angler hours			286	4,589	10,476	17,976	20,238	4,579	201	58,343
Angler trips			44	821	1,831	3,128	3,604	851	39	10,318
Anglers										
Resident			43	770	1,677	2,652	3,102	767	33	9,044
Nonresident			1	51	154	476	502	84	6	1,274
Charter excursions			14	221	490	825	962	247	12	2,771

Table 3.—Total harvest per hour, harvest per excursion, number harvested, and fishing effort (angler hours, trips, and charter excursions) from charter boats on the Michigan waters of Lake Erie (Grids 500, 701, 702, 703, 801 and 802), April through October 2003.

Species	Total catch per hour	Total catch per excursion	Month							
			Apr	May	Jun	Jul	Aug	Sep	Oct	Season
Coho salmon	0.000	0.000	0	0	0	0	0	0	0	0
Chinook salmon	0.000	0.000	0	0	0	0	0	0	0	0
Rainbow trout	0.000	0.004	0	1	4	2	0	0	0	7
Brown trout	0.000	0.000	0	0	0	0	0	0	0	0
Lake trout	0.000	0.000	0	0	0	0	0	0	0	0
Yellow perch	0.611	16.127	0	103	1,360	1,506	10,768	11,521	2,078	27,336
Walleye	0.844	22.287	168	1,875	23,513	10,458	708	1,054	0	37,776
Other	0.024	0.635	5	130	485	140	48	37	232	1,077
Lamprey on:										
Chinook salmon			0	0	2	0	0	0	0	2
Lake trout			0	0	0	0	0	0	0	0
Angler hours			595	2,436	23,404	11,798	3,600	2,311	595	44,738
Angler trips			67	446	4,547	2,229	680	475	104	8,548
Anglers										
Resident			59	360	4,054	1,922	587	407	81	7,470
Nonresident			8	86	493	307	93	68	23	1,078
Charter excursions			26	97	886	433	135	92	26	1,695

Table 4.—Total harvest per hour, harvest per excursion, number harvested, and fishing effort (angler hours, trips, and charter excursions) from charter boats on the Michigan waters of Lake Superior, April through October 2003.

			Month							
Species	Total catch per hour	Total catch per excursion	Apr	May	Jun	Jul	Aug	Sep	Oct	Season
Coho salmon	0.006	0.202	0	6	48	33	10	5	0	102
Chinook salmon	0.002	0.083	0	1	10	14	15	2	0	42
Rainbow trout	0.005	0.170	0	2	53	23	6	2	0	86
Brown trout	0.000	0.010	0	0	4	0	1	0	0	5
Lake trout	0.272	9.871	0	58	1,031	2,038	1,545	292	21	4,985
Yellow perch	0.000	0.000	0	0	0	0	0	0	0	0
Walleye	0.000	0.000	0	0	0	0	0	0	0	0
Other	0.003	0.117	0	1	7	48	3	0	0	59
Lamprey on:										
Chinook salmon			0	0	0	0	0	0	0	0
Lake trout			0	0	12	15	4	2	0	118
Angler hours			0	225	3,989	7,356	5,604	1,063	78	18,315
Angler trips			0	33	523	958	768	150	14	2,446
Anglers										
Resident			0	16	274	560	467	80	8	1,405
Nonresident			0	17	249	398	301	70	6	1,041
Charter excursions			0	8	109	193	156	34	5	505

Table 5.—Total harvest per hour, harvest per excursion, number harvested, and fishing effort (angler hours, trips, and charter excursions) from charter boats on the Michigan waters of the St. Clair system (Lake St. Clair, St. Clair River and Detroit River), April through October 2003.

			Month							
Species	Total catch per hour	Total catch per excursion	Apr	May	Jun	Jul	Aug	Sep	Oct	Season
Coho salmon	0.000	0.000	0	0	0	0	0	0	0	0
Chinook salmon	0.000	0.002	1	0	0	0	0	0	0	1
Rainbow trout	0.000	0.011	0	0	0	0	5	0	0	5
Brown trout	0.000	0.002	0	0	1	0	0	0	0	1
Lake trout	0.000	0.000	0	0	0	0	0	0	0	0
Yellow perch	0.466	12.974	3	39	536	796	878	1,765	2,029	6,046
Walleye	0.237	6.590	840	1,124	330	521	205	51	0	3,071
Other	0.353	9.843	0	1	1,527	1,500	1,104	425	30	4,587
Lamprey on:										
Chinook salmon			0	0	0	0	0	0	0	0
Lake trout			0	0	0	0	0	0	0	0
Angler hours			1,949	2,645	2,025	2,708	1,783	1,068	805	12,983
Angler trips			246	347	324	408	262	172	135	1,894
Anglers										
Resident			182	306	266	349	202	157	130	1,592
Nonresident			64	41	58	59	60	15	5	302
Charter excursions			58	73	88	110	67	40	30	466

Table 6.–Number of charter excursions on the Michigan waters of the Great Lakes (including tributaries), April through October 1990-2003.

	Year													
Lake	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Michigan	13,467	13,604	10,995	10,298	10,116	9,996	10,344	10,627	12,333	11,382	11,714	11,224	11,924	12,094
Huron	4,010	3,442	2,521	2,307	2,182	2,599	2,592	2,684	3,210	3,123	2,760	2,867	2,874	2,771
Erie	1,684	1,445	1,679	1,881	1,661	1,781	1,775	1,727	1,679	2,380	1,836	1,947	1,870[1]	1,695
Superior	755	791	743	618	455	515	524	497	517	607	482	477	430	505
St. Clair	779	643	509	414	299	336	407	394	432	389	348	433	246[1]	466
Total	20,695	19,925	16,447	15,518	14,713	15,227	15,642	15,929	18,171	17,881	17,140	16,948	17,344[1]	17,531

[1]Corrected values. All years prior to 2002 will be reviewed and updated in the next report.

Table 7.–Catch rates (fish per 100 angler hours) by charter anglers for salmonines on Lakes Michigan, Huron and Superior during 1990-2003.

	Year													
Lake/Species	90	91	92	93	94	95	96	97	98	99	00	01	02	03
Michigan														
Coho salmon	3.9	2.8	3.4	4.5	2.6	2.2	2.9	3.8	4.8	3.4	5.7	3.5	5.0	3.4
Chinook salmon	7.4	7.0	4.9	4.0	4.0	5.0	9.0	9.6	8.1	8.9	12.4	11.6	16.1	18.5
Rainbow trout	4.0	7.2	6.5	5.0	5.2	3.0	6.3	4.8	4.0	3.4	3.0	4.4	3.4	3.1
Brown trout	0.6	0.8	0.4	0.7	1.1	0.7	1.1	1.5	0.6	0.7	1.3	0.6	0.7	0.4
Lake trout	8.4	8.7	7.6	9.7	10.4	10.2	7.5	7.2	9.4	6.2	6.0	4.9	3.4	2.6
Huron														
Coho salmon	0.2	0.2	0.2	0.3	0.3	0.1	0.4	0.2	0.4	0.9	0.6	0.5	2.1	1.0
Chinook salmon	6.0	6.4	6.4	7.2	8.3	11.7	11.8	18.5	16.1	15.7	12.1	12.3	18.2	14.6
Rainbow trout	0.3	0.6	0.7	1.4	1.3	2.6	2.6	2.0	1.3	1.3	1.3	1.7	1.6	0.7
Brown trout	0.1	0.2	0.7	1.7	2.1	1.9	0.8	0.4	0.6	0.2	0.2	0.2	0.4	0.7
Lake trout	9.8	7.9	6.6	4.3	6.3	6.6	9.4	9.8	12.6	11.7	12.8	11.1	12.7	20.6
Superior														
Coho salmon	1.2	3.2	1.3	1.0	1.6	1.7	1.9	1.1	0.7	2.3	0.8	1.7	2.2	0.6
Chinook salmon	0.3	0.4	0.3	0.3	0.1	0.2	0.3	0.1	0.7	0.6	0.5	0.6	0.4	0.2
Rainbow trout	0.3	0.3	0.1	0.2	0.3	0.3	0.3	0.3	0.2	0.3	0.1	0.3	0.3	0.5
Brown trout	0.1	0.2	0.1	0.0	0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1
Lake trout	28.5	27.9	25.5	28.2	25.3	26.2	28.5	26.9	25.2	26.3	27.2	30.1	27.6	27.2

Table 8.—Catch rates (fish per 100 angler hours) by charter anglers for yellow perch and walleye on Lakes Huron, St. Clair and Erie during 1990-2003.

	Year													
Lake/Species	90	91	92	93	94	95	96	97	98	99	00	01	02	03
Huron														
Yellow perch	9.2	7.4	6.3	4.0	4.9	3.7	2.8	1.6	2.5	8.4	3.9	2.8	0.9	0.8
Walleye	5.1	7.1	6.7	7.4	6.7	3.5	3.4	3.0	3.7	3.4	4.2	3.0	2.3	3.3
St. Clair														
Yellow perch	13.8	16.8	15.1	40.4	85.5	66.9	100.3	103.3	42.9	41.3	48.3	55.1	107.9[1]	46.6
Walleye	32.4	20.4	12.5	18.4	12.3	15.5	12.3	13.1	16.1	16.3	7.2	22.2	13.3[1]	23.7
Erie														
Yellow perch	29.4	34.1	43.3	43.9	28.7	51.7	78.4	74.6	70.4	67.2	53.5	57.7	97.4[1]	61.1
Walleye	74.5	62.8	78.5	81.4	69.6	82.4	82.2	83.9	106.7	80.0	82.9	85.9	74.0	84.4

[1]Corrected values. All years prior to 2002 will be reviewed and updated in the next report.

Table 9.–Total catch per excursion (number of fish, for all salmonines combined) by charter anglers at various ports on lakes Michigan, Huron and Superior, April through October 1990-2003.

	Year													
Port	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Lake Michigan														
St. Joseph/Benton Harbor	7.3	8.7	7.3	8.1	7.7	7.7	10.0	9.8	9.3	7.0	10.3	7.4	8.9	8.4
Grand Haven	5.0	5.5	4.7	5.3	5.0	5.2	6.1	6.7	6.7	5.3	7.8	6.6	6.5	7.1
Ludington	9.3	11.1	8.4	8.8	7.4	7.2	10.8	8.4	8.1	8.8	9.1	9.0	9.3	9.4
Manistee	6.2	8.0	5.7	6.2	5.8	6.9	10.3	8.8	8.2	7.5	9.6	6.8	9.2	8.2
Frankfort/Elberta	7.1	7.5	5.8	6.6	6.2	6.7	8.8	7.6	8.2	8.1	7.6	7.3	7.7	7.6
Leland	7.2	9.5	9.0	6.9	9.1	8.6	9.4	9.1	8.1	7.1	6.9	6.2	7.1	6.4
Lake Huron														
Rogers City	3.2	3.3	2.5	3.9	5.2	6.6	5.9	8.2	5.4	6.3	4.1	3.9	4.1	6.2
Alpena	3.4	3.5	4.7	4.9	4.7	5.1	5.2	6.4	6.6	7.2	6.8	6.2	8.1	7.3
Oscoda	4.0	4.0	3.6	3.0	3.2	5.2	6.2	7.1	7.1	7.0	5.8	4.6	6.5	6.7
Grindstone City	5.6	6.1	5.9	4.7	5.5	7.0	8.0	9.3	10.7	10.1	10.6	9.4	12.3	12.7
Harbor Beach	3.6	2.9	3.2	2.8	3.5	4.9	6.6	6.5	6.7	7.1	5.9	6.5	7.2	7.8
Lake Superior														
Marquette	10.9	10.9	11.4	10.9	8.3	11.2	13.0	11.9	7.0	10.4	11.5	8.9	11.3	9.9
Ontonagon	12.5	11.5	14.1	14.0	10.1	11.1	15.9	11.9	13.7	14.8	13.2	14.5	13.7	14.1
Black River Harbor	12.0	12.9	10.6	13.5	14.1	12.6	14.0	13.1	10.7	13.6	12.3	15.9	14.8	12.7

Table 10.–Sea lamprey incidence (lamprey per 100 fish) for chinook salmon and lake trout harvested by the charter fishery in the Michigan waters of the Great Lakes, April through October 1990-2003.

Species/Year	Lake Michigan	Lake Huron	Lake Superior
Chinook salmon			
1990	0.5	18.6	0.0
1991	0.3	13.9	8.0
1992	0.2	13.6	0.0
1993	0.1	7.6	0.0
1994	0.3	7.1	0.0
1995	0.3	6.2	3.0
1996	0.1	3.9	0.0
1997	0.2	4.7	0.0
1998	0.4	5.2	0.0
1999	0.2	4.6	0.0
2000	0.4	7.3	1.1
2001	0.5	4.6	0.0
2002	0.8	4.2	0.0
2003	1.2	6.0	0.0
Lake trout			
1990	1.8	6.6	1.8
1991	1.2	5.7	1.6
1992	0.8	4.6	0.8
1993	0.6	2.1	0.5
1994	0.6	3.3	1.1
1995	1.0	2.7	0.7
1996	0.7	1.9	1.0
1997	1.1	3.0	0.6
1998	1.1	2.1	0.5
1999	1.2	1.8	0.5
2000	1.3	2.2	0.4
2001	1.3	2.0	0.7
2002	2.2	1.5	0.4
2003	2.4	1.3	0.3